migra SC/MC 5/3 ModbusRTU

Large Format, Graphics Compatible Display with ModbusRTU Interface

User's Manual

FEMA ELECTRÓNICA®

Distribuidor en España :
FEMA ELECTRÓNICA, SA
Pol. Ind. Santiga – Altimira 14 (T14 N2)
08210 Barberà del Vallès – BARCELONA
Tel. 93.729.6004 – info@fema.es
Fax 93.729.6003 – w w w .fema.es

Index

microSYST Systemelectronic GmbH, Zur Centralwerkstätte 10, D-92637 Weiden, Germany
Tel. (+49- 961) 3 91 66-0, Fax (+49-9 61) 3 91 66-10, www.microsyst.de, info@microsyst.de

1 General

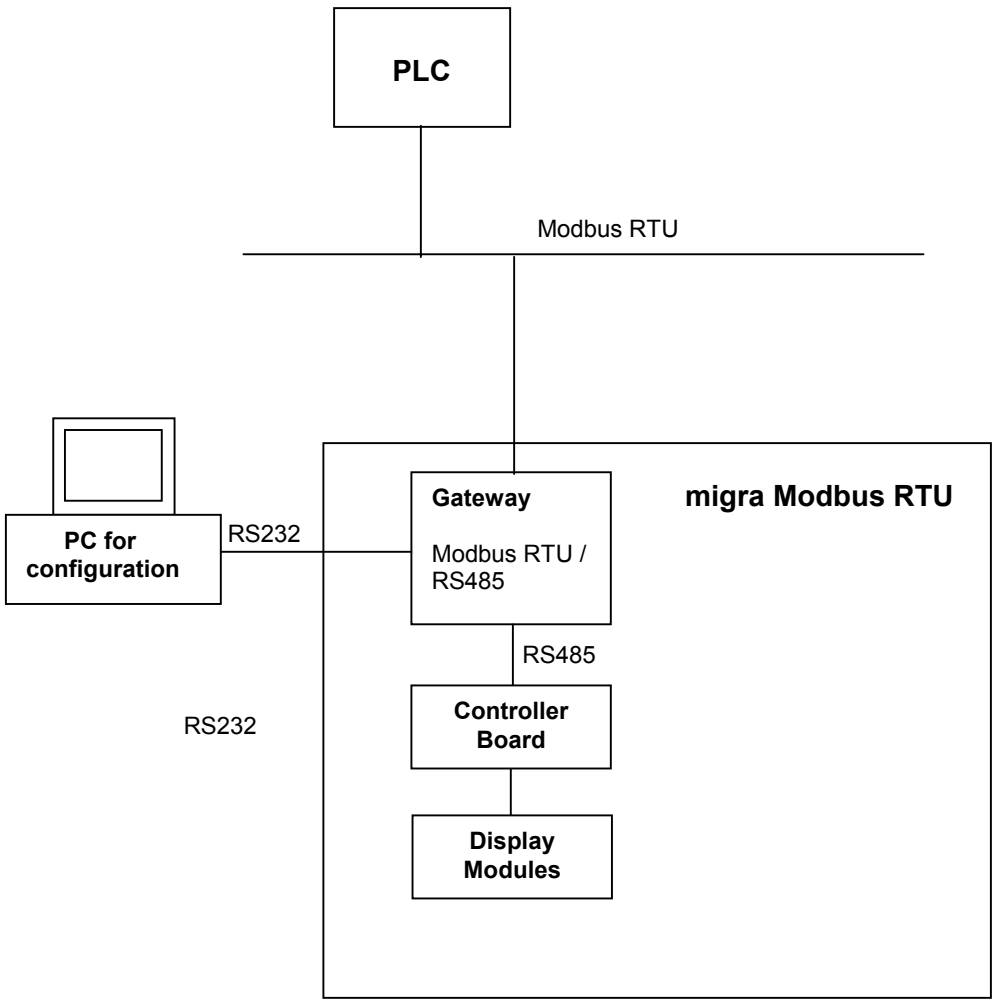
This display is based on the „migra SC/MC 5/3 Serial“, which is expanded by a ModbusRTU interface.

The interface is used for the connection to a ModbusRTU controller (PLC) at one side and the data exchange (RS485 frames) to the display at the other side.

The frames for the display correspond to those of the „serial MIGRA“ and are described in the **User's Manual „migra SC/MC 5/3 Serial“**.

2 System Overview

The display is controlled with a ModbusRTU interface.



microSYST Systemelectronic GmbH, Zur Centralwerkstätte 10, D-92637 Weiden, Germany
Tel. (+49- 961) 3 91 66-0, Fax (+49-9 61) 3 91 66-10, www.microsyst.de, info@microsyst.de

3 ModbusRTU Interface

The internal interface is the „ Modbus RTU Serial Gateway“ of the company HMS (AB7010). At the enclosed compact disc you can find the documentation and the necessary configuration software. Alternatively, you can find the files at the home page of HMS (www.anybus.com).

The connectors for the configuration (RS232) and the controlling via Modbus-RTU are accessible from the outside.

microSYST Systemelectronic GmbH, Zur Centralwerkstätte 10, D-92637 Weiden, Germany
Tel. (+49- 961) 3 91 66-0, Fax (+49-9 61) 3 91 66-10, www.microsyst.de, info@microsyst.de

3.1 Display Control Via ModbusRTU

The display represents a ModbusRTU-Slave and is controlled by a ModbusRTU-Master (f.e. a PLC).

To change the display contents, the ModbusRTU-Master has to write to some Registers. Therefore the commands “Force Multiple Registers” (function code $16_d=10_H$) or “Read/Write Registers” (function code $23_d=17_H$) can be used.

Here we assume that “Registers” are counted beginning at “0”. If your PLC starts counting at “1” you may have to increase the register-address by 1!

The frames, which are described in the user’s manual **„migra SC/MC 5/3 Serial“** („02 81 80 8X DATA-Unit 03“), must be entered in the **ModbusRTU output data** as follows:

Register (Output)		HMS memory address	Contents	Description
0400_H	HIGH	200_H	0	Control register HIGH: static 0!
	LOW	201_H	0	Control register LOW: static 0!
0401_H	HIGH	202_H	XX	Trigger byte: The transmission of the frame is executed with an increasing by one
	LOW	203_H	6... n+5	Length byte: frame length
0402_H	HIGH	204_H	02_H	MIGRA frame „STX“ (static)
	LOW	205_H	81_H	MIGRA frame „DA“ (static)
0403_H	HIGH	206_H	80_H	MIGRA frame „SA“ (static)
	LOW	207_H	80_H or 81_H	MIGRA frame „FC“: 0x80 = „without response“, 0x81 = „with response“
0404_H	HIGH	208_H	XX	MIGRA frame „Data unit, 1st Byte“
	LOW	209_H	XX	MIGRA frame „Data unit, 2nd Byte“
0405_H	HIGH	$20A_H$	XX	MIGRA frame „Data unit, 3rd Byte“
	LOW	…	XX	…
…	HIGH	208_H + (n-1)	XX	MIGRA frame „Data unit, nth Byte“
…	LOW	208_H + n	03_H	MIGRA frame „ETX” (static)

The length byte and the MIGRA frame must be entered first. Then, the trigger byte must be increased by one.
Thereby, the entered frame is transmitted to the MIGRA.

If the controlling happens without response frame („FC“ = 80_H), the respectively next frame must be sent approx. 100 to 200 ms soonest!

If you use the response („FC“ = 81_H), the respectively next frame may be sent immediately after receiving the response!

microSYST Systemelectronic GmbH, Zur Centralwerkstätte 10, D-92637 Weiden, Germany
Tel. (+49- 961) 3 91 66-0, Fax (+49-9 61) 3 91 66-10, www.microsyst.de, info@microsyst.de

A possible response appears in the **Modbus RTU input data**:

Register (Input)		HMS memory address	Contents	Description
0000_H	HIGH	000_H	0x9F	Status register HIGH: without meaning!
	LOW	001_H	0	Status register LOW: without meaning!
0001_H	HIGH	002_H	XX	Trigger byte: Is increased by 1 value after the reception of every response frame
	LOW	003_H	n+5	Length byte: response length
0002_H	HIGH	004_H	02_H	MIGRA response „STX“ (static)
	LOW	005_H	80_H	MIGRA response „DA“ (static)
0003_H	HIGH	006_H	81_H	MIGRA response „SA“ (static)
	LOW	007_H	80_H	MIGRA response „FC“ (static)
0004_H	HIGH	008_H	XX	MIGRA response „Data unit, 1st Byte“
	LOW	009_H	XX	MIGRA response „Data unit, 2nd Byte“
0005_H	HIGH	$00A_H$	XX	MIGRA response „Data unit, 3rd Byte“
	LOW	…	XX	…
…	HIGH	008_H + (n-1)	XX	MIGRA response „Data unit, nth Byte“
…	LOW	08_H + n	03_H	MIGRA response „ETX” (static)

The “Data unit” usually consists only of one byte (30_H).

Note:
In most cases, you do not need the response frame!
The necessary frame intervals, which depend on the effort for the evaluation, can also be found by trying.

microSYST Systemelectronic GmbH, Zur Centralwerkstätte 10, D-92637 Weiden, Germany
Tel. (+49- 961) 3 91 66-0, Fax (+49-9 61) 3 91 66-10, www.microsyst.de, info@microsyst.de

3.2 Example

The online text „microSYST“ shall be shown at the display (without response):

ModbusRTU Output Data:

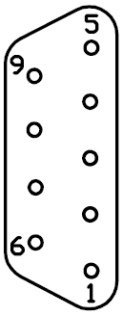
Register (Output)		HMS memory address	Contents	Description
0400_H	HIGH	200_H	0	Control register HIGH: static 0!
	LOW	201_H	0	Control register LOW: static 0!
0401_H	HIGH	202_H	x ↓ x+1	Trigger byte: The transmission of the frame is executed with an increasing by one (**after** the entries in HMS memory address 203_H ... 211_H have been done!)
	LOW	203_H	14	Length byte: frame length
0402_H	HIGH	204_H	02_H	MIGRA frame „STX“ (static)
	LOW	205_H	81_H	MIGRA frame „DA“ (static)
0403_H	HIGH	206_H	80_H	MIGRA frame „SA“ (static)
	LOW	207_H	80_H	MIGRA frame „FC“ (without response)
0404_H	HIGH	208_H	$6D_H$	='m"
	LOW	209_H	69_H	='i'
0405_H	HIGH	$20A_H$	63_H	='c'
	LOW	$20B_H$	72_H	='r'
0406_H	HIGH	$20C_H$	$6F_H$	='o'
	LOW	$20D_H$	53_H	='S'
0407_H	HIGH	$20E_H$	59_H	='Y'
	LOW	$20F_H$	53_H	='S'
0408_H	HIGH	210_H	54_H	='T'
	LOW	211_H	03_H	MIGRA frame „ETX" (static)

microSYST Systemelectronic GmbH, Zur Centralwerkstätte 10, D-92637 Weiden, Germany
Tel. (+49- 961) 3 91 66-0, Fax (+49-9 61) 3 91 66-10, www.microsyst.de, info@microsyst.de

3.3 Connector Pin Assignments

3.3.1 External Connections

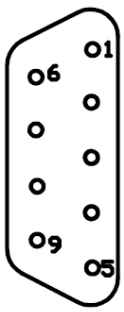
9pol. Sub-D Female Connector "ModbusRTU"



Pin	Assignment
1	
2	RS-232 TxD
3	RS-232 RxD
4	
5	GND Bus
6	+5V Bus Out
7	RS-485 D0 (Rx/Tx-)
8	RS-485 D1 (Rx/Tx+)
9	

Remark: Depending on DIP5 of the ModbusRTU-interface (see below) **either** the RS232-pins **or** the RS485-pins may be used. The unused pins have to be left open. Do **not** use a standard RS232-cable where **all** pins are connected. Otherwise the ModbusRTU-interface may be destroyed!!!

9pol. Sub-D Male Connector "RS232 migra"

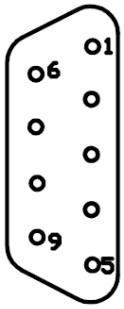


Pin	Assignment
1	
2	RxD
3	TxD
4	
5	GND
6	
7	
8	
9	

This connector serves for the configuration of the migra display.

microSYST Systemelectronic GmbH, Zur Centralwerkstätte 10, D-92637 Weiden, Germany
Tel. (+49- 961) 3 91 66-0, Fax (+49-9 61) 3 91 66-10, www.microsyst.de, info@microsyst.de

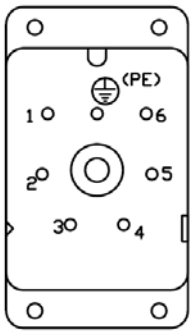
9pol. Sub-D Male Connector “Modbus Config”



Pin	Assignment
1	
2	RxD
3	TxD
4	
5	GND
6	
7	
8	
9	

Remark: This connector should not be used by the customer! The configuration is already done by microSYST and must not be changed! Otherwise the correct function of the display can not be guaranteed!

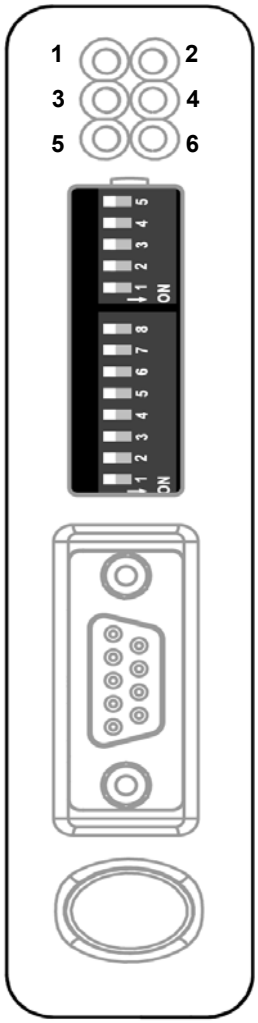
7pol. Mains Plug (230 VAC)



Pin	Assignment
1	L1
2	N
⏚ (PE)	PE

microSYST Systemelectronic GmbH, Zur Centralwerkstätte 10, D-92637 Weiden, Germany
Tel. (+49- 961) 3 91 66-0, Fax (+49-9 61) 3 91 66-10, www.microsyst.de, info@microsyst.de

3.3.2 Internal LEDs and Switches



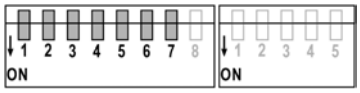
LED	State	Description
1 - Bus Error	Off	Normal operation
	Red	Bus error; CRC mismatch >10%
2 - Bus Ready	Off	Not powered
	Green	Normal operation (bus ready)
	Red	Bus is off line (bus not ready)
3 – Processing	Off	Currently not processing query
	Green, flashing	Currently processing query
4 – HW Settings	Off	Normal operation
	Red	Not configured
5 - Subnet Status	Off	Power off
	Green, flashing	Initializing and not running
	Green	Running
	Red	Stopped or subnet error, or timeout
6 - Device Status	Off	Power off
	Alternating Red/Green	Invalid or missing configuration
	Green	Initializing
	Green, flashing	Configuration OK

microSYST Systemelectronic GmbH, Zur Centralwerkstätte 10, D-92637 Weiden, Germany
Tel. (+49- 961) 3 91 66-0, Fax (+49-9 61) 3 91 66-10, www.microsyst.de, info@microsyst.de

migra SC/MC 5/3 ModbusRTU

Large Format, Graphics Compatible Display with ModbusRTU Interface

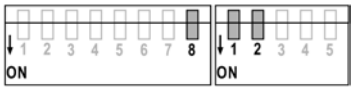
ModbusRTU Node Address



Node Address	DIP1	DIP2	DIP3	DIP4	DIP5	DIP6	DIP7
(reserved)	OFF	OFF	OFF	OFF	OFF	OFF	OFF
* 1	OFF	OFF	OFF	OFF	OFF	OFF	ON
2	OFF	OFF	OFF	OFF	OFF	ON	OFF
…	…	…	…	…	…	…	…
126	ON	ON	ON	ON	ON	ON	OFF
127	ON	ON	ON	ON	ON	ON	ON

* = Factory-Setting

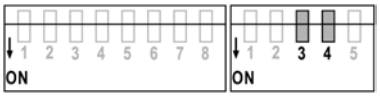
ModbusRTU Baudrate



Baudrate	DIP8	DIP1	DIP2
(reserved)	OFF	OFF	OFF
1200 baud	OFF	OFF	ON
2400 baud	OFF	ON	OFF
4800 baud	OFF	ON	ON
9600 baud	ON	OFF	OFF
* 19200 baud	ON	OFF	ON
38400 baud	ON	ON	OFF
57600 baud	ON	ON	ON

* = Factory-Setting

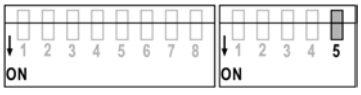
ModbusRTU Parity & Stop Bits



Parity	DIP3	DIP4
(reserved)	OFF	OFF
* No parity, 2 stop bits	OFF	ON
Even parity, 1 stop bit	ON	OFF
Odd parity, 1 stop bit	ON	ON

* = Factory-Setting

ModbusRTU Physical Interface



Interface Type	DIP5
RS232	ON
* RS485	OFF

* = Factory-Setting

microSYST Systemelectronic GmbH, Zur Centralwerkstätte 10, D-92637 Weiden, Germany
Tel. (+49- 961) 3 91 66-0, Fax (+49-9 61) 3 91 66-10, www.microsyst.de, info@microsyst.de

Important note:

To change the setting of the DIP-switches obey the following order:
- disconnect the power supply
- open the housing
- open the dip switch protection cap (carefully - using a little srew driver)
- set the dip switches as desired
- close the dip switch protection cap
- close the housing
- reconnect the power supply

While the housing is open power may only be applied by qualified personnel and nothing has to be touched inside the housing at this time! Otherwise electrical shock and danger to life may happen! Please be careful!

microSYST Systemelectronic GmbH, Zur Centralwerkstätte 10, D-92637 Weiden, Germany
Tel. (+49- 961) 3 91 66-0, Fax (+49-9 61) 3 91 66-10, www.microsyst.de, info@microsyst.de

4 Versions Overview

Version	Date	Remark, Description
1.00	07.05.08	Kreuzer, Nickl: Document created

Certified per **DIN EN ISO 9001:2000**.

microSYST Systemelectronic GmbH, Zur Centralwerkstätte 10, D-92637 Weiden, Germany
Tel. (+49- 961) 3 91 66-0, Fax (+49-9 61) 3 91 66-10, www.microsyst.de, info@microsyst.de